

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Richard M. Lawn, Gordon A. Vehar, and Karen L. Wion

Serial No.: 08/444,934

Group Art Unit: 1814

Filed: May 22, 1995

Examiner: Keith Hendricks

For: METHODS AND DEOXYRIBONUCLEIC ACID FOR THE PREPARATION
OF TISSUE FACTOR PROTEINAssistant Commissioner for Patents
Washington, D.C. 20231

DECLARATION UNDER 37 C.F.R. § 1.132

Sir:

I, William Konigsberg, hereby declare that:

1. I am Professor of Molecular Biophysics and Biochemistry in the Yale School of Medicine at Yale University, and hold a Ph.D. in Chemistry from Columbia University and a B.S. in Chemistry from Rensselaer Polytechnic Institute. I have been a faculty member at Yale University since 1964, and a full professor since 1968. I have over 35 years experience in the field of proteins, with an emphasis on blood proteins, and over 20 years experience in the study of tissue factor protein. This includes specific experience in cloning, manipulation, and expression of recombinant DNA encoding proteins, and specifically in the cloning, manipulation, and expression of recombinant DNA encoding human tissue factor. A partial curriculum vitae is attached to this declaration as an exhibit.

Considered
12-22-99
HS

U.S.S.N. 08/444,934

Filed: May 22, 1995

DECLARATION UNDER 37 C.F.R. § 1.132

I have supervised, trained, observed, and communicated with numerous individuals working in the fields of proteins and the cloning and expression of genes in general and tissue factor in particular, including during the period 1985-1988. Based in part on this experience, I am familiar with what those of skill in the arts of proteins, cloning and expression, and tissue factor would understand when reading documents relating to proteins, cloning and expression, and tissue factor. Such documents are not interpreted by those of skill in this field in a vacuum, rather, such individuals bring to their reading an understanding of how to interpret such documents based on what has gone before and the conventions of the field.

2. I have reviewed the specification of the above-identified application, and the specification of Application Serial No. 07/013,743, filed February 12, 1987, to which the above-identified application claims priority.

3. I have reviewed the Office Action mailed January 17, 1996 in connection with the above-identified application.

4. I understand that claims 20-26 have been rejected under 35 U.S.C. § 112, first paragraph, as not being enabled by the specification. Specifically, I understand that the rejection is based on the contention that the description in the specification describing that the transmembrane region of human tissue factor can be deleted does not convey to those of skill in the art that such deletions can also include the deletion of the C-terminal amino acids (the "cytoplasmic" domain of tissue factor).

U.S.S.N. 08/444,934

Filed: May 22, 1995

DECLARATION UNDER 37 C.F.R. § 1.132

5. As an expert in the field of proteins in general and tissue factor in particular, and as an individual with extensive knowledge of the level of understanding of those of skill in the art of proteins, cloning and expression, and tissue factor at the time Application Serial No. 07/013,743 was filed, I believe that those of skill in the arts of proteins, cloning and expression, and tissue factor at that time would have understood the descriptions of deletion of the transmembrane region of tissue factor to include tissue factor proteins from which the entire C-terminal region, including the transmembrane and cytoplasmic regions, had been deleted. This is so because the deletion of the transmembrane region as described in the specification would have been viewed and understood as an indication that the extracellular domain could be used separately from both the transmembrane region and the cytoplasmic region. This can best be understood in terms of the overall structure of tissue factor as described in the specification. At the time, it was understood that transmembrane proteins generally functioned in one of two ways. In the first, the main activity of the protein resides in the extracellular domain, with the transmembrane domain serving to merely anchor the extracellular domain. In this scheme, the cytoplasmic domain is essentially irrelevant except for the first two basic residues which serve to help anchor the hydrophobic sequence that spans the membrane. In the second scheme, the transmembrane region serves as conduit for conducting signals between the extracellular domain and the cytoplasmic domain. Receptor proteins are (and were) a well-known example of this type of transmembrane protein. When a ligand binds to the extracellular domain of a receptor protein, this binding is communicated to the cytoplasmic domain via the transmembrane domain (thereby propagating an external


U.S.S.N. 08/444,934

Filed: May 22, 1995

DECLARATION UNDER 37 C.F.R. § 1.132

signal to the inside of the cell). From this scheme, it is clear, and those of skill in the art at the time would have understood, that deletion of the transmembrane region is equivalent to deletion of both the transmembrane region and the cytoplasmic region, since the cytoplasmic domain serves no purpose in the absence of the transmembrane domain. For these reasons, it is my opinion that those of skill in the art at the time the application was filed would have considered the reference to deletion of the transmembrane region to indicate that the inventors contemplated deletion of the C-terminal portion of tissue factor, including the cytoplasmic domain.

6. I declare that all statements made herein of my own knowledge and belief are true and that all statements made on information and belief are believed to be true, and further, that the statements are made with the knowledge that willful false statements are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Date: 7/16/96

William Konigsberg

CURRICULUM VITAE

Rev. 6/3/96

William H. Konigsberg, Ph.D.



BORN: April 5, 1930

EDUCATION:

Rensselaer Polytechnic Institutes, N.Y.	B.Sc.	1952	Chemistry
Columbia University, N.Y.	Ph.D.	1956	Organic Chemistry

CAREER:

1956 - 57	N.S.F. Fellow, The Rockefeller Institute.
1957 - 59	Research Associate, The Rockefeller Institute.
1959 - 64	Assistant Professor, The Rockefeller Institute.
1964 - 76	Associate Professor of Biochemistry, Yale University.
1976 - 84	Professor of Molecular Biophysics and Biochemistry, Yale University.
1984 - 87	Chairman, Department of Molecular Biophysics and Biochemistry, Yale University
1987 -	Professor of Molecular Biophysics and Biochemistry, Yale University.

PROFESSIONAL ACTIVITIES:

1968 - 72	Editorial Board: Archives of Biochemistry.
1969 - 73	Editorial Board: Biochem. Biophys. Acta.
1986 -	Editorial Board: Proteins: Structure, Function, and Genetics.

OTHERS:

American Chemical Society.
American Society of Biological Chemistry (Membership Committee), 1969 - 70.
National Institutes of Health, Biochemistry Study Section, 1970 - 74
National Institutes of Health, Physiological Chemistry Study Section, 1970 - 74.
U.S. - Israel Binational Science Foundation, 1974 - 84.
Minority Biomedical Review Council, 1976 - 86.
Advisory Council: Minority Career Opportunity Section, National Institutes of Health, 1976 - 86.

OTHERS cont.:

Ad Hoc consultant:

National Science Foundation

American Cancer Society

Heart and Lung Institute

Chairman: Gordon Conference on Proteins, 1976 - 77.

National Science Foundation Study Section, 1980 - 84.

American Society of Microbiologists, 1984 - present.

William H. Konigsberg

1. Stracher, A., Konigsberg, W. and Becker, R.R. Isolation of DNP-peptides from DNP-polyvalvyl-proteins. *Biochem. Biophys. Acta* **20**, 595 (1956).
2. Craig, L.C., and Konigsberg, W. Further studies with bacitracin polypeptides. *J. Organic Chem.* **22**, 1345 (1957).
3. Craig, L.C., Konigsberg, W., and Hill, R.J. Bacitracin. *Ciba Foundation Symposium on Amino Acids and Peptides with Antimetabolic Activity*, 226 (1958).
4. Craig, L.C., Konigsberg, W., Stracher, A., and King, T.P. The characterization of lower molecular weight proteins by dialysis, *in IUPAC Symposium of Protein Structure*, Paris, 1957, (Neuberger, A., ed.) John Wiley and Sons, Inc., pp. 104-115 (1958).
5. Konigsberg, W., and Craig, L.C. Cellulose ion exchange and rotatory dispersion studies with the bacitracin polypeptides. *J. Am. Chem. Soc.* **81**, 3452 (1959).
6. Konigsberg, W. and Becker, R.R. The preparation of C¹⁴-polypeptidyl proteins. *J. Am. Chem. Soc.* **81**, 1429 (1959).
7. Craig, L.C., King, T.P., and Konigsberg, W. Homogeneity studies with insulin and related substances. *Ann. N.Y. Acad. Sci.* **88**, 571 (1960).
8. Hill, R.J. and Konigsberg, W. The isolation of peptides from tryptic digests of the alpha chain from human hemoglobin. *Biol. Chem.* **235**, 21 (1960).
9. Konigsberg, W., Hill, R.J., and Craig, L.C. The oxidation and acid isomerization of bacitracin A. *J. Organic Chem.* **26**, 3867 (1961).
10. Hill, R.J. and Konigsberg, W. The partial structural formula of the alpha chain of human hemoglobin. *J. Biol. Chem.* **236**:7 (1961).
11. Konigsberg, W. and Hill, R.J. The partial structural formula of the alpha chain of human hemoglobin. Paper read at the 5th International Congress of Biochemistry, Moscow, August, Pergamon Press Ltd. (1961).
12. Konigsberg, W., Guidotti, G., and Hill, R.J. The amino acid sequence of the alpha chain of human hemoglobin. *J. Biol. Chem.* **236**, 55 (1961).
13. Goldstein, J., Guidotti, G., Konigsberg, W., and Hill, R.J. The amino acid sequence around the "reactive sulfhydryl" group of the beta chain from human hemoglobin. *J. Biol. Chem.* **236**, 77 (1961).

14. Craig, L.C. and Konigsberg, W. Dialysis Studies, III. Modification of pore size and shape in cellophane membranes. *J. Phys. Chem.* **65**, 166 (1961).
15. Konigsberg, W. and Craig, L.C. On Bacitracin F. *J. Organic Chem.* **27**, 934 (1962).
16. Hill, R.J., Konigsberg, W., Guidotti, G., and Craig, L.C. The structure of human hemoglobin. I. The separation of the alpha and beta chains and their amino acid composition. *J. Biol. Chem.* **237**, 1549 (1962).
17. Guidotti, G., Hill, R.J., and Konigsberg, W. The structure of human hemoglobin. II. The separation and amino acid composition of the tryptic peptides from the alpha and beta chains. *J. Biol. Chem.* **237**, 2184 (1962).
18. Konigsberg, W., and Hill, R.J. The structure of human hemoglobin. III. The sequence of amino acids in the tryptic peptides of the alpha chain. *J. Biol. Chem.* **237**, 2547 (1962).
19. Hill, R.J. and Konigsberg, W. The structure of human hemoglobin IV. The chymotryptic digestion of the alpha chain of human hemoglobin. *J. Biol. Chem.* **237**, 2184 (1962).
20. Konigsberg, W. and Hill, R.J. The structure of human hemoglobin. V. The digestion of the alpha chain of human hemoglobin with pepsin. *J. Biol. Chem.* **237**, 2547 (1962).
21. Goldstein, J., Konigsberg, W., and Hill, R.J. The structure of human hemoglobin VI. The sequence of amino acids in the tryptic peptides of the beta chain. *J. Biol. Chem.* **238**, 2016 (1963).
22. Konigsberg, W., Goldstein, J., and Hill, R.J. The structure of human hemoglobin VII. The digestion of the beta chain of human hemoglobin with pepsin. *J. Biol. Chem.* **238**, 2028 (1963).
23. Guidotti, G., Konigsberg, W., and Craig, L.C. On the dissociation of normal adult human hemoglobin. *Proc. Natl. Acad. Sci. USA* **50**, 774 (1963).
24. Hill, R.J., Konigsberg, W., Guidotti, G., and Craig, L.C. "The preparation of the alpha and beta chains of human hemoglobin." *in Biochemical Preparations* Vol. **10** (Brown, G.B., ed.) John Wiley and Sons, Inc., New York (1963) pp. 55-66.
25. Guidotti, G. and Konigsberg, W. The Characterization of modified human hemoglobin. I. Reaction with iodoacetamide and N-ethylmaleimide. *J. Biol. Chem.* **239**, 1474 (1964).
26. Notani, G.W., Konigsberg, W., Craig, L.C., and Zinder, N.D. Structural studies on the coat protein of coliphage ϕ_2 . Sixth International Congress of Biochemistry, New York City, 1964.

27. Smyth, D.G., Blumenfeld, O.O. and Konigsberg, W. Reactions of N-ethylmaleimide with peptides and amino acids. *Biochem. J.* **91**, 589 (1964).
28. Rifkin, D., Rifkin, M., and Konigsberg, W. Amino acid compositions of tryptic peptides of two strains of mouse hemoglobin. *Fed. Proc.* **24**, 532 (1965).
29. Rifkin, D. and Konigsberg, W. The characterization of the tryptic peptides from the hemoglobin of the chimpanzee (*Pan Troglodytes*). *Biochim. Biophys. Acta* **104**, 457 (1965).
30. Konigsberg, W. and Lehmann, H. The amino acid substitution in hemoglobin ^{MI}wate. *Biochim. Biophys. Acta* **107**, 266 (1965).
31. Notani, G.W., Engelhart, D.L., Konigsberg, W., and Zinder, M. The suppression of a coat protein mutant of the bacteriophage F₂. *J. Mol. Biol.* **12**, 439 (1965).
32. Konigsberg, W., Huntsman, R.G., Wadia, F., and Lehmann, H. Haemoglobin ^{Dbeta}Punjab in an East Anglian family. *J. Royal Anthropological Inst.* **95**, 295 (1965).
33. Rifkin, D.B., Rifkin, M.R., and Konigsberg, W. The presence of two major hemoglobin components in an inbred strain of mice. *Proc. Natl. Acad. Sci. USA* **55**, 586 (1966).
34. Konigsberg, W., Weber, K., Notani, G. and Zinder, N. The isolation and characterization of the tryptic peptides from the F₂ bacteriophage coat protein. *J. Biol. Chem.* **241**, 2579 (1966).
35. Rifkin, D.B., Hirsh, D.I., Rifkin, M.R., and Konigsberg, W. Possible ambiguity in the coding of mouse hemoglobin. *Cold Spring Symposium on Quantitative Biology*, Vol. **XXXI**, 715 (1966).
36. Simon, S.R., and Konigsberg, W. Chemical modification of hemoglobins: A study of conformation restraint by internal bridging. *Proc. Natl. Acad. Sci. USA* **56**, 749 (1966).
37. Konigsberg, W. The arrangement of the tryptic peptides in the coat protein of the f₂ bacteriophage. *J. Biol. Chem.* **241**, 4534 (1966).
38. Weber, K., Notani, G., Wikler, M., and Konigsberg, W. Amino acid sequence of the f₂ coat protein. *J. Mol. Biol.* **20**, 423 (1966).
39. Rifkin, D.B., Rifkin, M., and Konigsberg, W. The isolation and amino acid composition of the tryptic peptides from the beta chain of C57BL/6 mouse hemoglobin. *Arch. Biochem. Biophys.* **116**, 284 (1966).
40. Simon, S.R., Konigsberg, W., Bolton, W., and Perutz, M.F. Identity of structure of horse deoxy- and oxyhaemoglobin after reaction with Bis (N-maleidomethyl) ether. *J. Mol. Biol.* **28**, 451 (1967).

41. Weber, K. and Konigsberg, W. Amino acid sequence of the F₂ coat protein. *J. Biol. Chem.* **242**, 3563 (1967).
42. Webster, R.E., Engelhardt, D.L., Zinder, N.D., and Konigsberg, W. Amber mutants and chain termination *in vitro*. *J. Mol. Biol.* **29**, 27 (1967).
43. Konigsberg, W. Subtractive Edman degradation *in Methods in Enzymology*, **XI**, 461, (1967).
44. Neer, E.J., Konigsberg, W., and Guidotti, G. The interactions between alpha and beta chains of human hemoglobin. *J. Biol. Chem.* **243**, 1971 (1968).
45. Neer, E.J. and Konigsberg, W. The characterization of modified human hemoglobin. II. Reaction with 1-Fluoro-2, 4-Dinitrobenzene. *J. Biol. Chem.* **243**, 1966 (1968).
46. Waxdal, M.J., Konigsberg, W., and Edelman, G.M. The structure of a human gamma G-immunoglobulin. *Cold Spring Harbor Symposia on Quantitative Biology*, **XXXII**, 53-63 (1967).
47. Edelman, G.M., Gall, W.E., Waxdal, M.J., and Konigsberg, W.H. The covalent structure of a human G-immunoglobulin. I. Isolation and characterization of the whole molecule, the polypeptide chains, and the tryptic fragments. *Biochemistry* **7**, 1950 (1968).
48. Waxdal, M.J., Konigsberg, W., Henley, W.L., and Edelman, G.M. Covalent structure of a G-immunoglobulin. II. Isolation and characterization of the cyanogen bromide fragments. *Biochemistry* **7**, 1959-1966 (1968).
49. Waxdal, M.J., Konigsberg, W., and Edelman, G.M. The covalent structure of a human G-Immunoglobulin. III. Arrangement of the cyanogen bromide fragments. *Biochemistry* **7**, 1967 (1968).
50. Gall, W.E., Cunningham, B.A., Waxdal, M.J., Konigsberg, W.H., and Edelman, G.M. The covalent structure of a human G-Immunoglobulin. IV. The interchain disulfide bonds. *Biochemistry* **7**, 1973 (1968).
51. Cunningham, B.A., Gottlieb, P.D., Konigsberg, W., and Edelman, G.M. The covalent structure of a human G-Immunoglobulin V. Partial amino acid sequence of the light chain. *Biochemistry* **7**, 1983 (1968).
52. Gottlieb, P.D., Cunningham, B.A., Waxdal, M.J., Konigsberg, W., and Edelman, G.M. Variable regions of heavy and light polypeptide chains of the same G-Immunoglobulin molecule. *Proc. Natl. Acad. Sci. USA* **61**, 168 (1968).
53. Sundaradas, G., Katze, J.R., Soll, D., Konigsberg, W., and Lengyel, P. On the recognition of serine transfer RNAs specific for unrelated codons by the same seryl-transfer RNA synthetase. *Proc. Natl. Acad. Sci. USA* **61**, 693 (1968).

54. Rutishauser, U., Cunningham, B., Bennett, C., Konigsberg, W., and Edelman, G.M. Amino acid sequence of the Fc portion of a human G myeloma protein. *Proc. Natl. Acad. Sci. USA* **61**, 1414 (1968).
55. Katze, J. and Konigsberg, W. Appendix: Position of the amber mutation in the MU9 coat protein. *J. Molec. Biol.* **42**, 97 (1969).
56. Konigsberg, W. Molecular Diseases *in* *Duncan Diseases of Metabolism*, 6th Edition, Chapter 4. W.A. Saunders Co., pp. 46-87 (1969).
57. Hoffman, E.P., Wilhelm, R.C., Konigsberg, W., and Katze, J.R. A structural gene for seryl-tRNA synthetase in *E. coli* K 12. *J. Molec. Biol.* **47**, 619 (1970).
58. Konigsberg, W., Maita, T., Katze, J., and Weber, K. Amino-acid sequence of the Q beta protein. *Nature* **227**, 271 (1970).
59. Katze, J.R. and Konigsberg, W. Purification and properties of seryl transfer ribonucleic acid synthetase from *E. coli*. *J. Biol. Chem.* **245**, 923 (1970).
60. Pitcher, S.E. and Konigsberg, W. The sequence of the NH₂-terminal cyanogen bromide fragment from the heavy chain of a GL myeloma protein. *J. Biol. Chem.* **245**, 1267 (1970).
61. Knowles, J.R., Katze, J.R., Konigsberg, W., and Söll, D., The interaction of seryl and of leucyl transfer ribonucleic acid synthetase with their cognate transfer ribonucleic acids. *J. Biol. Chem.* **245**, 1407 (1970).
62. Rutishauser, U., Cunningham, B.A., Bennet, C., Konigsberg, W., and Edelman, G.M. The covalent structure of a human G-Immunoglobulin. VIII. Amino acid sequence of heavy-chain cyanogen bromide fragments H₅-H₇. *Biochemistry* **9**, 3171 (1970).
63. Bennett, C., Konigsberg, W., and Edelman, G.M. The covalent structure of the human G-immunoglobulin. IX. Assignment of asparaginyl and glutaminyl residues. *Biochemistry* **9**, 3181 (1970).
64. Arndt, D.J. and Konigsberg, W. The reaction of N- -(Bromoacetoxymethyl) maleimide with hemoglobin. *J. Biol. Chem.* **246**, 2594 (1971).
65. Arndt, D.J., Simon, S.R., Maita, T., and Konigsberg, W. The characterization of chemically modified hemoglobins. III. Reaction with various N-substituted maleimides. *J. Biol. Chem.* **246**, 2602-2608 (1971).

66. Simon, S.R., Arndt, D.J., and Konigsberg, W. Structure and functional properties of chemically modified horse hemoglobin. I. Determination of the functional properties. *J. Mol. Biol.* **58**, 69 (1971).
67. Konigsberg, W., Simon, S., Arndt, D.J., and Moffat, K. Inhibition of the ligand linked conformational changes in hemoglobin. *Proc. 1st Inter-American Symp. Hemoglobins*, 123 (1971).
68. Moffat, J.K., Simon, S.R., and Konigsberg, W. Structure and functional properties of chemically modified horse hemoglobin. III. Functional consequences of structural alterations and their implications for the molecular bases of co-operativity. *J. Mol. Biol.* **58**, 89 (1971).
69. Maita, T. and Konigsberg, W. The amino acid sequence of the Qbeta coat protein. *J. Biol. Chem.* **246**, 5003 (1971).
70. Roy, D., and Konigsberg, W. Chromatography of proteins and peptides on diethylaminoethyl cellulose *in Methods in Enzymology*, Vol. XXV, 221 (1972).
71. Konigsberg, W. Subtractive Edman degradation *in Methods in Enzymology*, Vol. XXV, 326 (1972).
72. Konigsberg, W. Reduction of disulfide bridges in protein with dithiothreitol *in Methods in Enzymology*, Vol. XXV, 185 (1972).
73. Roy, D., Graziadei III, W.D., Lengyel, P. and Konigsberg, W. Amino terminal sequences of several reovirus type 3 capsid proteins are identical. *Biochem. and Biophys. Res. Comm.* **46**, 1066 (1972).
74. Rosenstein, R.W., Musson, R.A., Armstrong, M.Y.K., Konigsberg, W., and Richards, F.F. Contact regions for Dinitrophenyl and menadione in an immunoglobulin binding more than one antigen. *Proc. Natl. Acad. Sci. USA* **69**, 4877 (1972).
75. Yoshioka, M., Lifter, J., Hew, C.-L., Converse, C.A., Armstrong, M.Y.K., Konigsberg, W., and Richards, F.F. Studies on the combining regions of protein 460, a mouse A immunoglobulin which binds several haptens. Binding and reactivity of two types of photoaffinity labeling reagents. *Biochemistry* **12**, 4679 (1973).
76. Richards, F.F. and Konigsberg, W. How specific are antibodies? *Immunochem.* **10**, 545 (1973).
77. Waterson, R.J., Clarke, S.F., Kalousek, F., and Konigsberg, W. Seryl transfer ribonucleic acid synthetase from *E. coli*. *J. Biol. Chem.* **248**, 4181 (1973).

78. Clarke, S.J., Low, B., and Konigsberg, W. Close linkage of the gene *serC* (for phosphohydroxy pyruvate transaminase) and *serS* (for seryl-tRNA synthetase) in *E. coli* K-12. *J. Bacteriol.* **113**, 1091 (1973).
79. Clarke, S.J., Low, B., and Konigsberg, W. Isolation and characterization of a regulatory mutant of an aminoacyl-tRNA synthetase in *E. coli* K-12. *J. Bacteriol.* **113**, 1096 (1973).
80. Graziadei III, W.D., Roy, D., Konigsberg, W., and Lengyel, P. Translation of reovirus messenger ribonucleic acids synthesized *in vitro* into reovirus proteins in a mouse L cell extract. *Arch. Biochem. & Biophys.* **158**, 266 (1973).
81. Hew, C.-L., Lifter, J., Yoshioka, M., Richards, F.F. and Konigsberg, W. Affinity-labeled peptide obtained from the combining region of protein 460. Light chain labeling patterns using dinitrophenyl based photoaffinity labels. *Biochemistry* **12**, 4685 (1973).
82. Varga, J.M., Konigsberg, W., and Richards, F.F. Antibodies with multiple binding functions. Induction of single immunoglobulin species by structurally dissimilar haptens. *Proc. Natl. Acad. Sci. USA* **70**, 3269 (1973).
83. Waterson, R.M. and Konigsberg, W. Peptide mapping of aminoacyl-tRNA synthetases: Evidence for internal sequence homology in *E. coli* leucyl tRNA synthetase. *Proc. Natl. Acad. Sci. USA* **71**, 376 (1974).
84. Kalousek, F. and Konigsberg, W. Purification and characterization of histidyl transfer ribonucleic acid synthetase of *E. coli*. *Biochemistry* **13**, 999 (1974).
85. Nakashima, Y., Dunker, A.K., Marvin, D.A., and Konigsberg, W. The amino acid sequence of the DNA binding protein, the gene 5 product of fd filamentous bacteriophage. *FEBS Letters* **40**, 2 (1974).
86. Barstad, P., Rudikoff, S., Potter, M., Cohn, M., Konigsberg, W., and Hood, L. Immunoglobulin structure: Amino terminal sequences of mouse myeloma proteins that bind phosphorylcholine. *Science* **183**, 962 (1974).
87. Lifter, J., Hew, C.-L., Yoshioka, M., Richards, F.F., and Konigsberg, W. Affinity-labeled peptides obtained from the combining regions of myeloma protein 460. I. Heavy-chain-labeling patterns using dinitrophenyl azide photoaffinity label. *Biochemistry* **13**, 3567 (1974).
88. Richards, F.F., Lifter, J., Hew, C.-L., Yoshioka, M. and Konigsberg, W. Photoaffinity labeling of the combining region of myeloma protein 460. II. An interpretation of the labeling patterns. *Biochemistry* **13**, 3572 (1974).
89. Konigsberg, W. Molecular diseases *in* *Structural Organization of Proteins*. Duncan **4**, 59-104 (1974).

90. Richards, F.F., Amzel, L.M., Konigsberg, W., Manjula, B.N., Poljak, R.J., Rosenstein, R.W., Saul, F., and Varga, J.M. Polyfunctional antibody combining regions *in The Immune System Genes, Receptors, Signals*. Academic Press, Inc. 53 (1974).
91. Weber, L. and Konigsberg, W. The proteins of the RNA phages *in RNA Phages* (Zinder, N.D., ed.) p. 51 (1975).
92. Richards, F.F., Konigsberg, W., Rosenstein, R.W., and Varga, J.M. On the specificity of antibodies. Biochemical and biophysical evidence indicates the existence of polyfunctional antibody combining regions. *Science* **187**, 130 (1975).
93. Anderson, E., Nakashima, Y., and Konigsberg, W. Photo-induced cross-linkage of gene 5 protein and bacteriophage fd DNA. *Nucleic Acids Res.* **2**, 361-371 (1975).
94. Jesty, J., Spencer, A.K., Nakashima, Y., Nemerson, Y., and Konigsberg, W. The activation of coagulation Factor X. Identity of cleavage sites in the alternative activation pathways and characterization of the COOH-terminal peptide. *Biol. Chem.* **150**, 4497-4504 (1975).
95. Nakashima, Y., Wiseman, R.L., Konigsberg, W., and Marvin, D.A. Primary structure and sidechain interactions of PFL filamentous bacterial virus coat protein. *Nature* **253**, 68-71 (1975).
96. Kalousek, F., Konigsberg, W., and Nemerson, Y. Activation of Factor IX by activated Factor X: A link between the extrinsic and intrinsic coagulation systems. *FEBS Letters* **50**, 382-385 (1975).
97. Kalousek, F. and Konigsberg, W. Aminoacyl-tRNA synthetases *in MTP International Review of Science* (Arnstein, H.R.V., and Butterworths, U., eds.) Park Press, 7:57-88 (1975).
98. Richards, F.F., Rosenstein, R.W., Varga, J.M., and Konigsberg, W. Antibody specificity *in Immunological Disease*, 3rd Edition (Talmage, D.W., ed.) Vol. I:121-138 (1978).
99. Richards, F.F., Rosenstein, R.W., Varga, J.M. and Konigsberg, W. Antibody Combining Regions *in Comprehensive Immunology*, 1st Edition (Litman, G., and Good, R.A., eds.) Plenum Medical Book Co., New York, Vol. V, 117-154 (1978).
100. Richards, F.F. Varga, J.M., Rosenstein, R.W. and Konigsberg, W., The Antigen Combining Region of Immunoglobulins *in Immunochemistry* (Steward, M.W., and Glynn, L.W., eds.) John Wiley and Sons, Ltd., Chapter 2, 59-84 (1978).
101. Richards, F.F. and Konigsberg, W. Photo-Reactive Affinity Labels. Experience with Dnp-based diazoketones and azides in labeling the combining region of the mouse myeloma IgA Protein 460 *in Methods in Enzymology* (Jakoby-Wilchek, ed.) Acad. Press **46**, 508 (1977).

102. Kalousek, F. and Konigsberg, W. Internal sequence homology in *E. coli* isoleucyl- and valyl-tRNA synthetases. *FEBS Letters* **61**, 151 (1976).
103. Nakashima, Y., Napiorkowski, P., Schafer, D.E. and Konigsberg, W. Primary structure of the B subunit of cholera enterotoxin. *FEBS Letters* **68**, 275 (1976).
104. Goldsmith, M.E. and Konigsberg, W. Adsorption protein of the bacteriophage fd: Isolation, molecular properties, and location in the virus. *Biochemistry* **16**, 2686-2694 (1977).
105. Poljak, R.J., Nakashima, Y., Chen, B.L., and Konigsberg, W. Amino acid sequence of the V_H region of a human myeloma immunoglobulin (IgG New). *Biochemistry* **16**, 3412 (1977).
106. Gigot, D., Glansdorff, N., Legrain, C., Pierard, A., Stanlon, V., Konigsberg, W., Caplier, I., Strosberg, A.D., and Herve', G. Comparison of the N-terminal sequences of aspartate and ornithine carbamoyltransferases of *E. coli*. *FEBS Letters* **8**, 28-32 (1977).
107. Williams, K.R. and Konigsberg, W. Structural Changes in the T4 gene 32 protein induced by DNA and polynucleotides. *J. Biol. Chem.* **253**, 2463 (1978).
108. Paradiso, P., Nakashima, Y., and Konigsberg, W. Photo-induced crosslinking of gene 5 protein to DNA *in Biomolecular Structure and Function*, (Agris, P.F., ed.) Academic Press, New York, 581 (1978).
109. Sillerud, L.O., Prestegard, J.H., Yu, R.K., Schafer, D.E., and Konigsberg, W. Assignment of the ¹³C nuclear magnetic resonance spectrum of aqueous ganglioside G_{M1} micelles. *Biochem.* **17**, 2619 (1977).
110. Konigsberg, W.H., and Steinman, H.M. Strategy and methods of sequence analysis *in The Proteins*, 3rd Edition, Vol. **3**, 2-179 (1977).
111. Frangione, B., Nakashima, Y., Konigsberg, W., and Wiseman, R.L. The amino acid sequence of the major coat protein subunit of the filamentous virus Xf. *FEBS Letters* **96**, 381-384 (1978).
112. Armstrong, M.Y.K., Ebenstein, P., Konigsberg, W., and Richards, F.F. Endogenous RNA tumor viruses are activated during chemical induction of murine plasmacytomas. *Proc. Natl. Acad. Sci. USA* **75**, 4549-4552 (1978).
113. Rosenstein, R.W., Zeldis, J.B., Konigsberg, W., and Richards, F.F. The location and expression of idiotypic determinants in the immunoglobulin variable region. (I. Characterization of antibodies directed against the variable region of mouse myeloma immunoglobulins 315 and 460). *Molec. Immunol.* **16**, 361-370 (1979).

114. Zeldis, J.B., Konigsberg, W., Richards, F.F., and Rosenstein, R.W. The location and expression of idiotypic determinants in the immunoglobulin variable region. (II. Chain location of variable region determinants). *Molec. Immunol.* **16**, 371 (1979).
115. Zeldis, J.B., Riblett, R., Weigert, M., Konigsberg, W., Richards, F.F., and Rosenstein, R.W. The location and expression of idiotypic determinants in the immunoglobulin variable region (III. Expression of the protein 315 and 460 idiotypic determinants in mouse anti-Dnp antibodies). *Molec. Immunol.* **16**, 657 (1979).
116. Paradiso, P.R., Nakashima, Y., and Konigsberg, W. Photochemical crosslinking of protein-nucleic acid complexes: The attachment of the fd gene 5 protein to fd DNA. *J. Biol. Chem.* **254**, 4739 (1979).
117. Konigsberg, W. Protein structure and molecular dysfunction: Hemoglobin *in Metabolic Control In Disease*, 8th edition, (Bondy, P., and Rosenberg, L., eds.) Chapter 2, pp. 27-71 (1979).
118. Henderson, L.E., Oroszlan, S., Konigsberg, W. A micromethod for complete removal of dodecyl sulfate from proteins by ion-pair extraction. *Anal. Biochem.* **93**, 153 (1979).
119. Williams, K.R., Sillerud, L.O., Schafer, D.E., and Konigsberg, W.H. DNA binding properties of the T4 DNA helix-destabilizing protein: A calorimetric study. *J. Biol. Chem.* **254**, 6426-6432 (1979).
120. Spicer, E.K., Williams, K.R., and Konigsberg, W. T4 gene 32 protein trypsin-generated fragments: Fluorescence measurement of DNA-binding parameters. *J. Biol. Chem.* **254**, 6433-6436 (1979).
121. Sillerud, L.O., Schafer, D.E., Yu, R.K., and Konigsberg, W. Calorimetric properties of the bilayer-micelle transition in mixtures of ganglioside G_{M1} and Dipalmitoylphosphatidylcholine. *J. Biol. Chem.* **254**, 10876-10880 (1979).
122. Kempe, T.D., Beattie, W.G., Weisman, S., and Konigsberg, W. Correlation of the protein and nucleic acid sequences for the major structural protein of simian virus 40. *J. Biol. Chem.* **254**, 7561-7569 (1979).
123. Cabrer, B., Hidharu, T., Broeze, R.J., Kempe, T.D., Williams, K., Slattery, E., Konigsberg, W., and Lengyel, P. Structural characteristics of interferons from mouse Ehrlich ascites tumor cells. *J. Biol. Chem.* **254**, 3681-3684 (1979).
124. Wilson, G.G., Karen, K.Y.Y., Gordon, J.E., and Konigsberg, W. High frequency generalized transduction by bacteriophage T4. *Nature* **280**, 80-82 (1979).
125. Wilson, G.G., Neve, R.L., Edlin, G.J., and Konigsberg, W. The *BAM* H1 restriction site is located in or near gene 8. *Genetics* **93**, 285-296 (1979).

126. Nakashima, Y. and Konigsberg, W. Chemical modification and molecular orientation of the B protein in the filamentous bacterial virus Pfl. *J. Mol. Biol.* **138**, 493 (1980).
127. Carson, S.D. and Konigsberg, W. Cadmium increases tissue factor (Coagulation Factor III) activity by facilitating its reassociation with lipids. *Science* **208**, 307-309 (1980).
128. Sancar, A., Stachelek, C., Konigsberg, W., and Rupp, W.D. Sequences of the *recA* gene and protein. *Proc. Natl. Acad. Sci. USA* **77**, 2611-2615 (1980).
129. Williams, K.R., LoPresti, M.B., Setoguchi, M., and Konigsberg, W. Amino acid sequence of the T4 DNA helix-destabilizing protein (DNA binding protein/gene 32 protein/partial proteolysis/protein sequencing). *Proc. Natl. Acad. Sci. USA* **77**, 4614 (1980).
130. Carson, S.D. and Konigsberg, W. Lipid activation of coagulation factor III apoprotein (Tissue Factor) - Reconstitution of the protein-membrane complex. *Thrombosis and Haemostasis* **44**, 12-15 (1980).
131. Hill, R.J. and Konigsberg, W. Mutation in the structural gene for seryltransfer ribonucleic acid synthetase of *E. coli* which affects formation of its gene product at high temperature. *J. Bacteriology* **141**, 1163-1169 (1980).
132. Lin, T.C., Webster, R.E., and Konigsberg, W. Isolation characterization of the C and D proteins coded by Gene II and Gene VI in the filamentous bacteriophage fl and fd. *J. Biol. Chem.* **255**, 10331-10337 (1980).
133. Rosen, N.L., Onodera, M., Hotez, P.J., Bogucki, M.S., Elce, B., Patton, C., Konigsberg, W., Cross, G.A.M., and Richards, F.F. Surface glycoproteins of two early blood stream variants of *Trypanosoma congolese*. (I. Production of a relapsing infection in rodents). *J. Exp. Parasitology* **52**, 210 (1981).
134. Onodera, M., Rosen, N.L., Lifter, J., Hotez, P.F., Bogucki, M.S., Davis, G., Patton, C.L., Konigsberg, W., and Richards, F.F. Surface glycoproteins of two early blood stream variants of *Trypanosoma congolese*. (II. Purification and partial chemical characterization of two sequential surface variant specific glycoproteins.) *J. Exp. Parasitology* **53**, 1 (1981).
135. Spicer, E.K., Kavanaugh, W.M., Dallas, W.S., Falkow, S., Konigsberg, W., and Schafer, D.E. Sequence homologies between subunits of *E. coli* and *V. cholerae* enterotoxins. *Proc. Natl. Acad. Sci. USA* **78**, 50-54 (1981).
136. Grant, R., Lin, T.C., Konigsberg, W. and Webster, R. Structure of the filamentous bacteriophage fl: Location of the A, C, and D minor coat proteins. *J. Biol. Chem.* **256**, 539 (1981).

137. Richards, F.F., Rosen, N.L., Onodera, M., Bogucki, M.S., Neve, R.L., Hotez, P., Armstrong, M.Y.K., and Konigsberg, W. Antigenic variation and the surface glycoproteins of *Trypanosoma congolense*. *Fed. Proc.* **40**, 1434-1439 (1981).
138. Grant, R.A., Lin, T.C., Webster, R.E., and Konigsberg, W. Structure of the filamentous bacteriophage: Isolation, characterization, and location of the minor coat proteins and orientation of the DNA *in Bacteriophage Assembly*, Alan R. Liss, N.Y., pp. 413-428 (1981).
139. Williams, K.R., and Konigsberg, W. DNA binding proteins *in Gene Amplification and Analysis of Nucleic Acid Structures*, Vol. II, (Chirikian, J.G. and Papas, F.S., eds.) Elsevier, pp. 475-536 (1981).
140. Nakashima, Y., Frangione, B., Wiseman, R.L., and Konigsberg, W. Primary structure of the major coat protein of the filamentous bacterial viruses, Ifl and Ide. *J. Biol. Chem.* **256**, 5792-5797 (1981).
141. Konigsberg, W., and Richards, F.F. *Immunochemistry*, McGraw-Hill Encyclopedia. pg. 42, (1981).
142. Bach, R., Nemerson, Y., and Konigsberg, W. Purification and characterization of bovine tissue factor. *J. Biol. Chem.* **256**, 8324-8331 (1981).
143. Carson, S.D. and Konigsberg, W. Coagulation factor III (tissue factor) interaction with phospholipid vesicles induced by cadmium; characterization of the reconstituted protein-membrane complex. *Bioscience Reports* **1**, 197-205 (1981).
144. Carson, S.D., and Konigsberg, W. Phenyl-sepharose chromatography of membrane proteins solubilized in Triton X-100. *Anal. Biochem.* **166**, 398 (1981).
145. Bogucki, M.S., Onodera, M., Rosen, N.L., Lifter, J., Hotez, P., Konigsberg, W., and Richards, F.F. Surface glycoproteins of two early blood stream variants of *Trypanosoma congolense*. III. Immunological studies on two sequential surface variant specific glycoproteins. *J. Exp. Parasitology* **52**, 427 (1982).
146. Paradiso, P.R., and Konigsberg, W. Photochemical crosslinking of the gene 5 protein fd DNA complex from fd infected cells. *J. Biol. Chem.* **257**, 1462 (1982).
147. Spicer, E.K., Noble, J., Nossal, N., Konigsberg, W., and Williams, K. Bacteriophage T4 gene 45: Sequences of the structural gene and its protein product. *J. Biol. Chem.* **257**, 8972-8979 (1982).
148. Williams, K.R., L'Italien, J., Guggenheimer, R., Sillerud, L., Spicer, E., Chase, J., and Konigsberg, W. Comparative peptide mapping by HPLC: Identification of single amino acid substitutions in temperature sensitive mutants *in Methods in Protein Sequence Analysis* (Elzinga, M., ed.) Humana Press, pp. 499-507 (1982).

149. Konigsberg, W., and Godson, G.N. Evidence for use of rare codons in the dnaG gene and other regulatory genes of *E. coli*. *Proc. Natl. Acad. Sci. USA* **80**, 687 (1983).
150. Konigsberg, W., Henderson, L. Amino acid sequence of the catalytic subunit of aspartyl transcarbamoylase from *E. coli*. *Proc. Natl. Acad. Sci. USA* **80**, 2467 (1983).
151. Spicer, E.K. and Konigsberg, W. Organization and structure of four T4 genes coding for DNA replication proteins *in Bacteriophage T4 Monograph* (Eds.: C.K. Mathews, E.M. Kutter, G. Mosig and P.B. Berget) American Society for Microbiology, pp. 291-301 (1983).
152. Williams, K.R. and Konigsberg, W. Structure-function relationships in the T4 single-stranded DNA binding protein *in Bacteriophage T4 Monograph* (Mathews, C.K., Kutter, E.M., Mosig, G., and Berget, P.B., eds.) American Society for Microbiology, 82-89 (1983).
153. Merritt, S.C., Tschudi, C., Konigsberg, W., and Richards, F.F. Reverse transcription of trypanosome variable antigen mRNAs initiated by a specific oligonucleotide primer. *Proc. Natl. Acad. Sci. USA* **80**, 1536 (1983).
154. Carson, S.D., Carson, S.M., and Konigsberg, W.H. Monoclonal antibody recognizing rabbit IgG (Fab): A specific reagent for second-antibody applications. *J. Biol. Chem.* **258**, 9510 (1983).
155. Stachelek, C., Stachelek, J., and Konigsberg, W.H. Primary structure analysis of the mutant recA 441 and recA 430 proteins. *J. Biol. Chem.* **258**, 7918-7920 (1983).
156. Horwich, A.L., Kraus, J.P., Williams, K., Kalousek, F., Konigsberg, W., and Rosenberg, L.E. Molecular cloning of the cDNA coding for rat ornithine transcarbamylase. *Proc. Natl. Acad. Sci. USA* **80**, 4258 (1983).
157. Konigsberg, W.H., and Henderson, L. Removal of sodium dodecyl sulfate from proteins by Ion-pair extraction. *Methods in Enzymology* **91**, 254-259 (1983).
158. Prigodich, R.V., Casas-Finet, J., Williams, K.R., Konigsberg, W., and Coleman J.E. ¹H-NMR (500 MHz) of gene 32 protein-oligonucleotide complexes. *Biochemistry* **23**, 552 (1984).
159. Lalor, T.M., Kjeldgaard, M. Shimamoto, G.T., Strickler, J.E., Merritt, S.C., Konigsberg, W.H., and Richards, F.F. Trypanosome variant specific glycoproteins: A polygene protein family with multiple folding patterns. *Proc. Natl. Acad. Sci. USA* **81**, 998-1002 (1984).
160. Horwich, A.L., Fenton, W.A., Williams, K.R., Kalousek, F., Kraus, J.P., Doolittle, R.F., Konigsberg, W., and Rosenberg, L.E. Structure and expression of a cDNA for the nuclear coded precursor of human mitochondrial ornithine transcarbamylase. *Science* **224**, 1068-1074 (1984).
161. Merrill, B.W., Williams, K.R., Chase, J.W., and Konigsberg, W. Photochemical crosslinking of the *Escherichia coli* single-stranded DNA binding protein to

- oligodeoxynucleotides: Identification of phenylalanine 60 as the site of cross-linking. *J. Biol. Chem.* **259**, 10850-10856 (1984).
162. Hemmings, H.C. Jr., Williams, K.R., Konigsberg, W.H., and Greengard, P. DARPP-32, A dopamine- and adenosine 3':5' monophosphate-regulated neuronal phosphoprotein: 1. Amino acid sequence around the phosphorylated threonine. *J. Biol. Chem.* **259**, 14486-14490 (1984).
 163. Rusche, J.R., Konigsberg, W., and Howard-Flanders, P. Isolation of altered RecA polypeptides and interaction with ATP and DNA. *J. Biol. Chem.* **260**, 949-955 (1985).
 164. Adari, H.Y., Rose, K., Williams, K.R., Konigsberg, W.H., Lin, T.-C., and Spicer, E.K. Cloning, nucleotide sequence, and overexpression of the bacteriophage T4 regA gene. *Proc. Natl. Acad. Sci. USA* **82**, 1901-1905 (1985).
 165. Williams, K.R., Williams, N.D., Konigsberg, W.H., and Yu, R.K. Acidic lipids enhance cathepsin D cleavage of the myelin basic protein. *J. Neuroscience Research* **15**, 137-145 (1986).
 166. Joyce, C.J., Ollis, D.L., Rush, J., Steitz, T.A., Konigsberg, W.H. and Grindley, N.D.F. Relating structure to function for DNA polymerase I of *E. coli* *in Protein Structure, Folding and Design* (Oxender, D., ed.) Alan R. Liss, New York. UCLA Symposia Molec. Cell. Biol. Vol. **32**, 197-205 (1986).
 167. Guha, A., Bach, R., Konigsberg, W., and Nemerson, Y. Affinity purification of human tissue factor: Interaction of factor VII and tissue factor in detergent micelles. *Proc. Natl. Acad. Sci. USA* **83**, 299-302 (1986).
 168. Williams, K.R., Hemmings Jr., H.C., LoPresti, M.B., Konigsberg, W.H., and Greengard, P. Complete primary structure of bovine brain DARPP-32, a dopamine- and cyclic AMP-regulated inhibitor of protein phosphatase-1: Homology with protein phosphatase inhibitor-1. *J. Biol. Chem.* **261**, 1890-1903 (1986).
 169. Prigodich, R.V., Shamoo, A.Y., Williams, K.R., Chase, J.W., Konigsberg, W. and Coleman, J.E. ¹H-NMR (500 MHz) Identification of the aromatic residues of gene 32 protein involved in DNA binding by the use of protein containing perdeuterated aromatic residues and by site-directed mutagenesis. *Biochemistry* **25**, 3666-3672 (1986).
 170. Stachelek, C., Stachelek, J., Swan, J., Botstein, D. and Konigsberg, W. Identification, cloning and sequence determination of the genes specifying hexokinase A and B from yeast. *Nucl. Acids Res.* **14**, 945-963 (1986).
 171. Giedroc, D.P., Keating, K.M., Williams, K.R., Konigsberg, W.H., and Coleman, J.E. Gene 32 protein, the single-stranded DNA binding protein from T4 is a zinc metalloprotein. *Proc. Natl. Acad. Sci. USA* **83**, 8452-8456 (1986).

172. Shamoo, Y., Adari, H., Konigsberg, W.H., Williams, K.R., and Chase, J.W. Cloning of T4 gene 32 and expression of the wild type protein under pL regulation in *E. coli*. *Proc. Natl. Acad. Sci. USA* **83**, 8844-8848 (1986).
173. Coleman, J.E., Williams, K.R., King, G.C., Prigodich, R.V., Shamoo, Y. and Konigsberg, W.H. Protein chemistry-NMR approach to mapping functional domains in single-stranded DNA binding proteins. *J. Cell. Biochem.* **32**, 305-326 (1986).
174. Coleman, J.E., Williams, K.R., King, G.C., Prigodich, R.V., Shamoo, Y. and Konigsberg, W.H. Mapping the functional domains in single-stranded DNA binding proteins, gene 32 and gene 5 *in Protein Modification and Design*. (Alan R. Liss, Publishers), (1986).
175. Strickler, J.E. and Binder, D., L'Italien, J.J., Shimamoto, G., Wait, S.W., Dalheim, L.J., Novotny, J., Radding, J.A., Konigsberg, W.H., Armstrong, M.Y.K., Richard, F.F. and Lalor, T.M. *Trypanosoma congolense*: Structure and molecular organization of surface glycoproteins of two early bloodstream variants. *Biochemistry* **26**, 796-805 (1987).
176. Spicer, E., Horton, R., Bloem, L., Bach, R., Williams, K.R., Guha, A., Kraus, J., Nemerson, Y., and Konigsberg, W.H., Isolation of cDNA clones coding for human tissue factor: Primary structure of the protein and cDNA. *Proc. Natl. Acad. Sci. USA* **84**, 5148-5152 (1987).
177. Lin, T.-C., Rush, J., Spicer, E.K., and Konigsberg, W.H., Cloning and expression of T4 DNA polymerase. *Proc. Natl. Acad. Sci. USA* **84**, 7000-7004 (1987).
178. Shamoo, Y., Roberts, W.J., Coleman, J.E., Williams, K.R., and Konigsberg, W.H., Site specific mutagenesis of T4 gene 32: The role of tyrosine residues in protein: Nucleic acid interactions *in Protein Structure Folding and Design II*, UCLA Symposia on Molecular and Cellular Biology (Alan R. Liss Publishers) Vol. **69**:385-394 (1987).
179. Williams, K.R., Stone, K.L., Fritz, M.K., Merrill, B.M., Konigsberg, W.H., Pandolfo, M., Valentini, O., Riva, S., Reddigari, S., Patel, G.L., and Chase, J.W. Use of HPLC comparative peptide mapping in structure/function studies *in Proteins: Structure and Function* (L'Italien, J.J., ed.) Plenum Publishing Corp., 45-52 (1988).
180. Spicer, E.K., Rush, J., Fung, C., Reha-Krantz, L.J., Karam, J.D., and Konigsberg, W.H. Primary structure of T4 DNA polymerase: Evolutionary relatedness to eucaryotic and other procaryotic DNA polymerases. *J. Biol. Chem.* **263**, 7478-7486 (1988).
181. Shamoo, Y., Williams, K.R., Konigsberg, W.H. Photochemical cross-linking of bacteriophage T4 single-stranded DNA binding protein (gp32) to oligo-p (dT)₈: Identification of phenylalanine 183 as the site of cross-linking. *Proteins: Structure, Function and Genetics* **4**, 1-6 (1988).
182. Konigsberg, W.H. and Nemerson, Y. Molecular cloning of the cDNA for human tissue factor. *Cell* **52**, 639 (1988).

183. Bach, R., Konigsberg, W.H., and Nemerson, Y. Human tissue factor contains Thioester-linked palmitate and stearate on the cytoplasmic half-cystine. *Biochemistry* **27**, 4227-4231 (1988).
184. Bauer, K.A., Conway, E.M., Bach, R., Konigsberg, W.H., Griffin, J.D., and Demetri, G. Tissue factor gene expression in acute myeloblastic leukemia. *Thrombosis Research* **56**, 425-430 (1989).
185. Conway, E.M., Bach, R., Rosenberg, R.D., and Konigsberg, W.H. Tumor necrosis factor enhances expression of tissue factor mRNA in endothelial cells. *Thrombosis Research* **53**, 231-241 (1989).
186. Bloem, L.J., Chen, L., Konigsberg, W.H., and Bach, R. Serum stimulation of quiescent human fibroblasts induces the synthesis of tissue factor mRNA followed by the appearance of tissue factor antigen and procoagulant activity. *J. Cell. Phys.* **139**, 418-423 (1989).
187. Shamoo, Y., Keating, K.M., Williams, K.R. and Konigsberg, W.H. Structure/function relationships in the bacteriophage T4 single-stranded DNA binding protein *in Molecular Biology of Chromosome Function*. (Adolph, K.W., ed.) Springer-Verlag, New York, 302-322 (1990).
188. Shamoo, Y., Ghosaini, L.R., Keating, K.M., Williams, K.R., Sturtevant, J.M., and Konigsberg, W.H. (1989) Site-specific mutagenesis of T4 gene 32: the role of tyrosine residues in protein:nucleic acid interactions. *Biochemistry* **28**, 7409-7417 (1989).
189. Rush, J., Lin, T-C., Quinones, M., Spicer, E.K., Douglas, I., Williams, K.R., and Konigsberg, W.H. The 44P subunit of the T4 DNA polymerase accessory protein complex catalyzes ATP hydrolysis. *J. Biol. Chem.* **264**, 10943-10953 (1989).
190. Rush, J. and Konigsberg, W.H. Photoaffinity labeling of the Klenow fragment of DNA polymerase I with 8-N₃dATP. *J. Biol. Chem.* **265**, 4821-4827 (1990).
191. Rush, J. and Konigsberg, W.H. Rapid purification of overexpressed T4 DNA polymerase. *Preparative Biochemistry* **19**, 329-340 (1989).
192. Williams, K.R. and Konigsberg, W.H. Identification of amino-acid residues at the interface of protein:nucleic complexes by photochemical cross-linking *in Methods in Enzymology* (Sauer, R., ed.) Academic Press, New York. Vol. **208**, 516-539 (1991).
193. Reha-Krantz, L.J., Stocki, S., Nonay, R.L., Dimayuga, E., Goodrich, L.D., Konigsberg, W.H. and Spicer, E.K. DNA polymerization in the absence of exonucleolytic proofreading: *in vivo* and *in vitro* studies. *Proc. Natl. Acad. Sci. USA* **88**, 2417-2421 (1991).

194. Shamoo, Y., Webster, K. R., Williams, K. R., and Konigsberg, W. H. A retrovirus-like zinc domain is essential for translational repression of bacteriophage T4 gene 32. *J. Biol. Chem.* **266**, 7967-7970 (1991).
195. Pawashe, A., Ezekowitz, M., Lin, T-C., Horton, R., Bach, R., and Konigsberg, W.H. Molecular cloning, characterization and expression of cDNA for rabbit brain tissue factor. *Thrombosis and Haemostasis* **66**, 315-320 (1991).
196. Webster, K.R., Shamoo, Y., Konigsberg, W., and Spicer, E.K. A rapid method for large-scale purification of synthetic oligoribonucleotides. *BioTechniques* **11**, 658-661 (1991).
197. Waxman, E., Ross, J.B.A., Laue, T.M., Guha, A., Thiruvikraman, S.V., Lin, T-C., Konigsberg, W. and Nemerson, Y. Tissue factor and its extracellular soluble domain: the relationship between intermolecular association with factor VIIa and enzymatic activity of the complex. *Biochemistry* **31(16)**, 3998-4003 (1992).
198. Webster, K.R., Keill, S., Konigsberg, W., Williams, K.R. and Spicer E.K. Identification of amino acid residues involved in bacteriophage T4 regA protein:nucleic acid interactions. *J. Biol. Chem.* **267(36)**, 26097-26103 (1992).
199. Hu, T., Bach, R.R., Horton, R., Konigsberg, W.H. and Todd, M.B. Synthesis of tissue factor messenger RNA and procoagulant activity in breast cancer cells in response to serum stimulation. *Thrombosis Research* **72**, 155-168 (1993).
200. Shamoo, Y., Tam, A., Konigsberg, W.H. and Williams, K.R. Translational repression by the bacteriophage T4 gene 32 protein involves specific recognition of an RNA pseudoknot structure. *J. Mol. Biol.* **232**, 89-104 (1993).
201. Pawashe, A., Golino, P., Ambrosio, G., Migliaccio, F. Ragni, M., Pascucci, I., Chiariello, M., Bach, R. Garen, A., Konigsberg, W. H., Ezekowitz. A monoclonal antibody against rabbit tissue factor inhibits thrombus formation in stenotic injured rabbit carotid arteries. *Circulation Res.* **74**, 56-63 (1993).
202. Hu, T., Bach, R.R., Horton, R., Konigsberg, W.H. and Todd, M.B. Procoagulant activity in cancer cells is dependent on tissue factor expression. *Oncology Res.* **6**, 321-327 (1994).
203. Shamoo, Y. Williams, K.R. and Konigsberg, W.H. The function of zinc in bacteriophage T4 gene 32 protein. In *Molecular Biology of Bacteriophage T4* (Karam, J., Ed.) pp. 305-306, *American Society of Microbiology*, Washington, D.C (1994).
204. Williams, K.R., Shamoo, Y., Spicer, E.K., Coleman, J.E. and Konigsberg, W.H. Correlation of structure and function in proteins: an overview of approaches utilizing the T4 gp32 nucleic acid binding protein as a prototype. In *Molecular Biology of*

- Bacteriophage T4* (Karam, J., Ed.) pp. 301-304, *American Society of Microbiology*, Washington, D.C. (1994).
205. Lin, T.C., Karam, G. and Konigsberg, W.H. Isolation, characterization and kinetic properties of truncated forms of T4 DNA polymerase that exhibit 3'-5' exonuclease activity. *J. Biol. Chem.* **269**, 19286-19294 (1994).
 206. Ross, J.B.A., Hasselbacher, C.A., Kumosinski, T.F., King, G., Laue, T.M., Guha A., Nemerson, Y., Konigsberg, W.H., Rusinova, E., and Waxman, E. Testing a FTIR-consistent model for the soluble domain of human tissue factor. In *Molecular Cloning* (Kumosinski, T.F. and Liebman, M.N., eds.) *American Chemical Society Symposium Series*, ACS Symp. **576**, 113-122 (1994).
 207. Konigsberg, W.H. Limited proteolysis of DNA polymerases as a probe of functional domains. In: *The Methods in Enzymology* **262** (Campbell, J.L. Ed.), 331-347 (1995).
 208. Bromberg, M.E., Konigsberg, W.H., Madison, J.F., Pawashe, A., and Garen, A. Tissue factor promotes melanoma metastasis by a pathway independent of blood coagulation. *Proc. Natl. Acad. Sci. USA* **92**, 8205-8209 (1995).
 209. Kirchhofer, D., Guha, A., Nemerson, Y., Konigsberg, W.H., Vilbois, F., Chene, C., anner, D.W. & D'Arcy, A. Activation of blood coagulation factor VIIa with cleaved tissue factor extracellular domain and crystallization of the active complex. *Proteins: Struc., Func. and Genet.* **22**, 419-425 (1995).
 210. Shamoo, Y., Friedman, A.M., Parsons, M.R., Konigsberg, W.H., and Steitz, T.A. Crystal structure of a replication fork single-stranded DNA binding protein (T4 gp32) complexed to DNA. *Nature* **376**, 362-366 (1995).
 211. Hasselbacher, C.A., Rusinova, E., Waxman, E., Rusinova, R., Kohanski, R.A., Lam, W., Guha, A., Du, J., Lin, T.C., Polikarpov, I., Boys, C.W.G., Nemerson, Y., Konigsberg, W.H., Ross, B.A. Environments of the four tryptophan in the extracellular domain of human tissue factor: comparison of results from absorption and fluorescence difference spectra of tryptophan replacement mutants with the crystal structure of the wild-type protein. *Biophysical J.* **69**, 20-29 (1995).
 212. Banner, D.W., D'Arcy, A., Chene, C., Winkler, F.K., Guha, A., Konigsberg, W.H., Nemerson, Y. and Kirchhofer, D. The crystal structure of the complex of blood coagulation factor VIIa with soluble tissue factor. *Nature* **380**, 41-46 (1996).
 213. Wang, J., Yu, P., Lin, T.C., Konigsberg, W.H., & Steitz, T.A. (1996) Crystal structure of an NH₂-Terminal fragment of T4 DNA polymerase and its complexes with single stranded DNA and with divalent metal ions. *Biochemistry* (In press).

214. Fang, C.H., Lin, T.C., Guha, A., Nemerson, Y. & Konigsberg, W.H. (1996) Activation of factor X by factor VIIa complexed with human-mouse tissue factor chimeras requires human exon 3. *Thromb. and Haem.* (In press).

Rev. 6/3/96